

B2
cont.

29
21.

-7-

A radiation detector as claimed in Claim 16 wherein the sensor is a thermopile.

REMARKS

Claims 1-9 have been rejected under 35 U.S.C. 103 as being unpatentable over Fraden in view of Pompei et al.

Claim 1, which is directed to a tapered unitary thermal mass, has been amended to eliminate unnecessary limitations and to more clearly point out the inventive subject matter. In responding to the rejection of Claim 1, a brief review of the Fraden patent may prove helpful. The Fraden patent discloses a cylindrically-shaped barrel (14) mounted in alignment with a pyroelectric radiation sensor (18) as shown in Figure 6. A removable protective cover (38) surrounds the barrel and the sensor. The cover is optionally employed in certain applications for the stated purpose of preventing the barrel surface from contacting the object to be measured. While a portion of the cover about the sensor is tapered, the cover is cylindrically shaped about the barrel.

In contrast, the present invention is an improvement in a device disclosed in the Applicant's prior detector presented in U.S. Patent No. 4,993,419. As set forth in amended Claim 1, a unitary thermal structure is in close thermal contact with the radiation sensor. An outer surface is tapered about the tube such that a unitary thermal mass of increasing thickness is provided about the tube. This unitary thermal structure is provided for maximizing conductance of the thermal mass to the sensor within a limited diameter. Further, note that the present invention includes an outer sleeve which surrounds the unitary thermal structure serving a similar purpose as the cover in the Fraden patent.

Based on the foregoing, Applicant contends that providing a unitary thermal mass thermally coupled to the sensor and of increasing diameter about the tube is not suggested by the

teachings of Fraden. Further, the Pompei et al. reference has been studied and no suggestion of a unitary thermal mass in accordance with the present invention has been found. In light of the amendments and the foregoing remarks, reconsideration of Claim 1 is respectfully requested.

Claims 2-5 have been amended pursuant to the amendments to Claim 1. These claims depend from Claim 1 and therefore follow from the foregoing amendments and remarks. Further, special note of Claims 3 and 5 should be taken. It has been found that a narrow field of view radiation detector provides a more accurate reading of tympanic temperature. Claim 3 recites a field of view of less than 60 degrees. In the radiation detector of Claim 5, the length of the tube and the field of view through the tube from the sensor are such that the sensor only views an ear canal within less than about one centimeter of a tympanic membrane. As such, more accurate indications of tympanic temperature can be obtained. Reconsideration of Claims 2-5 is respectfully requested.

Claim 10 has only been rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to point out the subject matter of the invention. Claim 6 has been amended to incorporate the limitations of Claim 10 and to eliminate unnecessary limitations. Claim 10 has correspondingly been canceled. Claims 7-9 have been amended to correspond to the amendments to Claim 6. These claims depend from Claim 6 and should thus also be allowable. Reconsideration of Claims 6-9 is respectfully requested.

Claims 11-15 have been added. Claim 11 is substantially similar to Claim 23 of Applicants' U.S. Patent No. 4,993,419 and Claims 13-15 are substantially similar to Claims 7-8 of Applicants' U.S. patent 5,012,813 to which this application claims priority. However, Claims 11-15 are set forth in broader terms than the issued claims. The '419 and '813 patents are involved in an infringement dispute. The infringer

has provided an opinion which is submitted with the attached Information Disclosure Statement. New Claims 11-15 obviate any questions raised in that opinion regarding the scope of the patented claims. They are directed to compensation of a target temperature, such as that of the ear canal and tympanic membrane target area, to provide an internal temperature approximation such as a tympanic core temperature approximation. The compensation is by an indication of ambient temperature. Applicants are prepared to file a terminal disclaimer to overcome a rejection based on double patenting.

Claims 14-21 have been added and are directed to a radiation detector providing a field of view of about 60 degrees or less. Claim 14 is substantially similar to Claim 6 prior to being amended although set forth in somewhat broader terms. As such, Applicant presumes the rejection of Claim 6 would apply to Claim 14 and provides the following comments in support of patentability of Claim 14.

Applicant points out that one purpose of the present invention is to provide a radiation detector which produces high accuracy temperature measurements. As noted in the summary section of the subject application, it has been found that a narrow field of view radiation detector provides a more accurate reading of tympanic temperature. While the detector in the parent application, now patent 4,993,419, had a wide field of view of about 120 degrees, the detector of the present invention has a field of view of about 60 degrees or less for providing more accurate indications of tympanic or ear canal temperature. In the present invention, that field of view is obtained by controlling the reflectance of the surface of the tube, the length of the tube and the position of the sensor behind the tube as discussed in the paragraph on pages 8 and 9 of the specification.

Applicant notes that the Fraden patent states at column 2, lines 50-52 that the length of the barrel determines the angle of view A as shown in Figure 6. The angle A which is shown is

less than 60 degrees. If the inner surface of the barrel were of very high emissivity, ie. totally nonreflective, the illustrated angle A would be the field of view. However, as discussed in column 2, lines 43-50, the inner surface of the barrel is shiny. His low emissivity (column 2, line 47) guarantees high reflectivity. Thus, the detector would receive radiation from angles much greater than A which reflect from the barrel, and the field of view would be much greater than the illustrated angle A. In fact, Applicant has tested a device manufactured by the Assignee of the Fraden patent and has determined that the device has a field of view of about 90 degrees.

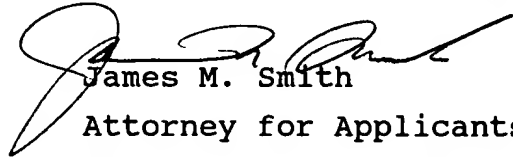
The radiation detector disclosed in Pompei et al. provides a field of view of less than 60 degrees and is suited for scanning surfaces at ranges of up to ten feet and beyond for obtaining a quick, qualitative indication of a source of radiation. While the detector in Pompei et al. has a narrow field of view, the device is not directed to or suitable for ear temperature measurements. As such, Applicant contends that the Fraden reference alone or in combination with the Pompei et al. reference does not teach or suggest the result that a narrow field of view detector of 60 degrees or less provides more accurate indications of tympanic or ear canal temperature. Based on the foregoing remarks, acceptance of Claim 14 is respectfully requested.

Claims 15-21 depend from Claim 14 and therefore follow from the foregoing remarks. Acceptance of these claims is respectfully requested.

In light of the foregoing amendments and remarks, reconsideration of all rejected claims is respectfully

requested so that the application may be passed to issue. If it is believed that a telephone conversation will expedite the prosecution of the application, the Examiner is invited to call the undersigned.

Respectfully submitted,



James M. Smith

Attorney for Applicants

Registration No. 28,043

(617) 861-6240

Lexington, MA

Dated: 3/2/92